<u>Problem 5.4</u>

An LTI system is described by difference equation :

$y[n] = 2x[n] - 3x[n-1] + 2x[n-2]$

(a) Values of y[n] over index range $0 \leq n \leq 10$:

<u>When $n = 0$</u>

$y[0] = 2x[0] - 3x[-1] + 2x[-2] = 2$

<u>When $n = 1$</u>

$y[1] = 2x[1] - 3x[0] + 2x[-1] = 1$

<u>When $n = 2$</u>

$y[2] = 2x[2] - 3x[1] + 2x[0] = 2$

<u>When $n = 3$</u>

$y[3] = 2x[3] - 3x[2] + 2x[1] = -1$

<u>When $n = 4$</u>

$y[4] = 2x[4] - 3x[3] + 2x[2] = 2$

<u>When $n = 5$</u>

$y[5] = 2x[5] - 3x[4] + 2x[3] = 3$

<u>When $n = 6$</u>

$y[6] = 2x[6] - 3x[5] + 2x[4] = 1$

<u>When $n = 7$</u>

$y[7] = 2x[7] - 3x[6] + 2x[5] = 1$

<u>When $n = 8$</u>

$y[8] = 2x[8] - 3x[7] + 2x[6] = 1$

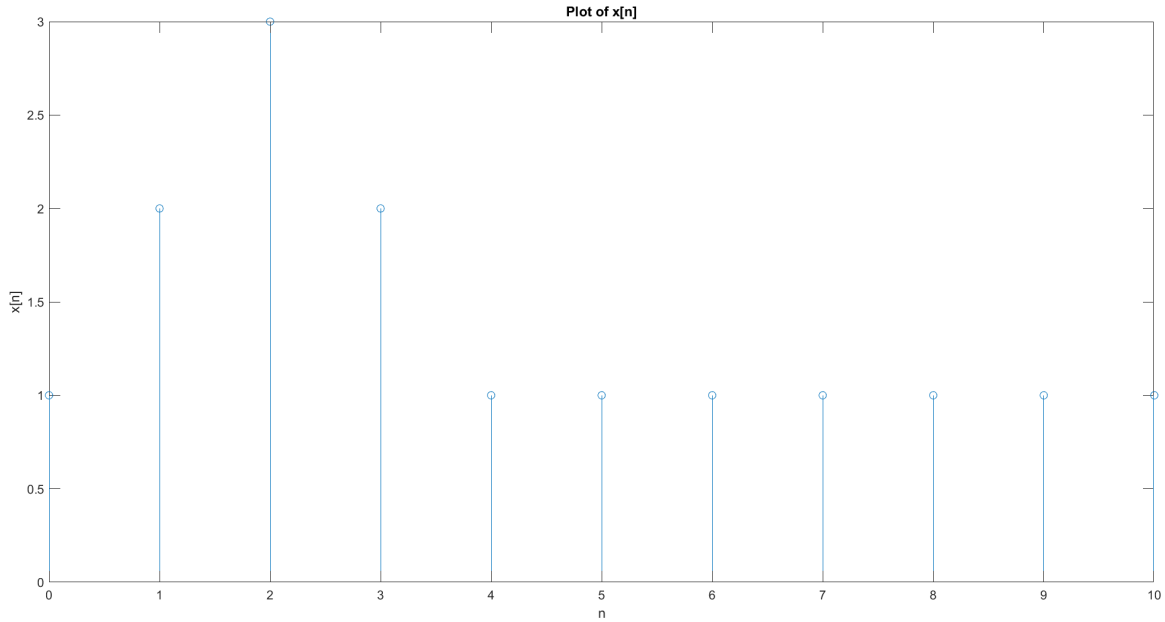
<u>When $n = 9$</u>

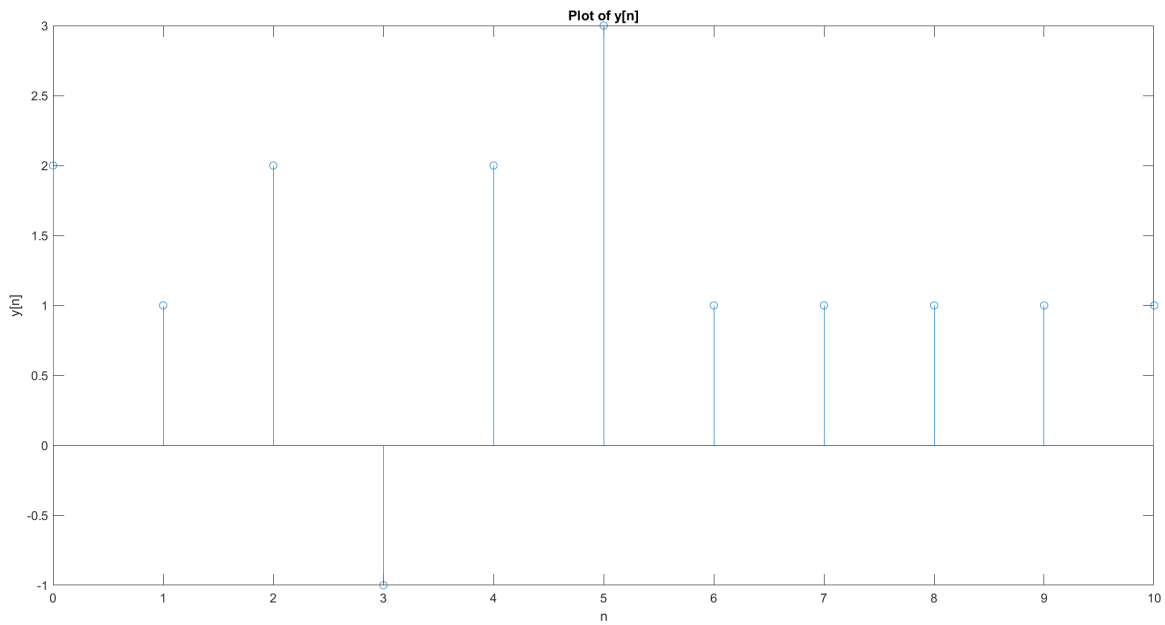
$y[9] = 2x[9] - 3x[8] + 2x[7] = 1$

<u>When $n = 10$</u>

$y[10] = 2x[10] - 3x[9] + 2x[8] = 1$

(b) <u>Plot of $x[n]$ and $y[n]$</u> :





(c) The response of the system to a unit impulse input is. Find output $y[n] = h[n]$, when $x[n] = \delta[n]$

$y[n] = h[n] = 2\delta[n] - 3\delta[n-1] + 2\delta[n-2]$

<u>Plot of $h[n]$</u>: